

PROCEEDINGS  
OF THE  
ACADEMY OF NATURAL SCIENCES  
OF  
PHILADELPHIA.

1869.

---

*Jan. 5th.*

The President, DR. HAYS, in the Chair.

Twenty-nine members present.

---

*Jan. 12th.*

The President, DR. HAYS, in the Chair.

Thirty-one members present.

---

*Jan. 19th.*

DR. BRIDGES in the Chair.

Thirty-three members present.

A committee having been appointed to draught resolutions with reference to the death of John Cassin, late Vice-President and Curator of the Academy, the following were offered and adopted:

The members of the Academy of Natural Sciences of Philadelphia having learned with great regret of the decease of their late Vice-President and Curator, JOHN CASSIN, do, in commemoration of the bereavement they have suffered, resolve,

1. That in the death of Mr. Cassin the Academy has lost a member and officer whose thoughts and acts were ever devoted to its interests and prosperity.

2. That in addition to the devotion thus manifested, they have been deprived of the counsel and exertions of one who was always ready to aid in every enterprise tending to the objects of the institution.

3. That in this unexpected termination of the scientific pursuits of their deceased associate, science has suffered a loss which cannot be repaired; the loss of one who, more than any other student of Natural History in America, 1869.]



has advanced the science of Ornithology, and whose matured and well cultivated mind enabled him to render cheerfully and generously much assistance to younger students and to institutions of learning in that and other branches of knowledge.

4. That we deeply sympathize with the family of our respected colleague in this severe affliction.

5. That the Recording Secretary be directed to transmit a copy of these resolutions to the family of the deceased.

Jan. 26th.

DR. BRIDGES in the Chair.

Fifty-five members present.

Pursuant to the By-Laws, an election of members of the Standing Committees for the ensuing year was held, with the following result:

<p style="text-align: center;"><i>ETHNOLOGY.</i></p> <p>J. AITKEN MEIGS, S. S. HALDEMAN, F. V. HAYDEN.</p> <p style="text-align: center;"><i>ENTOMOLOGY AND CRUSTACEA.</i></p> <p>JOHN L. LECONTE, GEO. H. HORN, TRYON REAKIRT.</p> <p style="text-align: center;"><i>COMP. ANAT. AND GEN. ZOOLOGY.</i></p> <p>JOS. LEIDY, HARRISON ALLEN, S. B. HOWELL.</p> <p style="text-align: center;"><i>ORNITHOLOGY.</i></p> <p>BERNARD A. HOOPES, W. P. TURNBULL, E. SHEPPARD.</p> <p style="text-align: center;"><i>MAMMALOLOGY.</i></p> <p>HARRISON ALLEN, EDW. D. COPE, R. S. KENDERDINE.</p> <p style="text-align: center;"><i>CONCHOLOGY.</i></p> <p>GEO. W. TRYON, JR., E. R. BEADLE, C. F. PARKER.</p>	<p style="text-align: center;"><i>HERPETOLOGY AND ICHTHYOLOGY.</i></p> <p>EDW. D. COPE, S. WEIR MITCHELL, THADDEUS NORRIS.</p> <p style="text-align: center;"><i>GEOLOGY.</i></p> <p>ISAAC LEA, F. V. HAYDEN, T. A. CONRAD.</p> <p style="text-align: center;"><i>PHYSICS.</i></p> <p>ROBT. BRIDGES, R. E. ROGERS, JACOB ENNIS.</p> <p style="text-align: center;"><i>LIBRARY.</i></p> <p>JOS. LEIDY, J. L. LECONTE, ROBT. BRIDGES.</p> <p style="text-align: center;"><i>BOTANY.</i></p> <p>ELIAS DURAND, THOS. MEEHAN, ELIAS DIFFENBAUGH.</p> <p style="text-align: center;"><i>MINERALOLOGY.</i></p> <p>WM. S. VAUX, S. R. ROBERTS, JOS. WILLCOX.</p> <p style="text-align: center;"><i>PALAEONTOLOGY.</i></p> <p>T. A. CONRAD, WM. M. GABB, HORATIO C. WOOD, JR.</p>
---	--

Dr. W. S. W. Ruschenberger was elected Vice-President, and member of the Publication Committee, and Geo. W. Tryon, Jr.,

[Jan.

was elected Curator, thus filling the vacancies caused by the death of Mr. Cassin.

The following gentlemen were elected members :

R. J. Levis, M. D., John J. Stevenson, Wm. M. Wilson, and Caleb S. Hallowell.

The following were elected correspondents :

Col. E. B. Carling, U. S. A. ; Wm. Blackmore, of London.

---

*Feb. 9th.*

MR. JOS. JEANES in the Chair.

Twenty-two members present.

---

*Feb. 16th.*

DR. RUSCHENBERGER, Vice-President, in the Chair.

Thirty-four members present.

The following paper was presented for publication :

Note on Microscopic Crystals contained in some minerals. By Isaac Lea.

The death of Chas. N. Bancker was announced.

Professor Cope made some remarks on a new series of fossils, from the lime stone caves in the Southern States. He enumerated the species of extinct mammals, reptiles and fishes, discovered by him in the lime-stone breccia, which is the remnant of a cave in Wythe Co., Virginia.

He gave twenty species of mammalia, of which nine only could be demonstrated to be different from existing species. These were *Megalonyx Jeffersonii*, *Stereodectes tortus* Cope, *Dicotyles nasutus*, *Mixophagus spelaeus* Cope, gen. et sp. nov., *Sciurus panolius* Cope, sp. nov., *Tamias laevidens* Cope, sp. nov., *Tapirus haysii*, *Ursus amplidens*. *Hemiacis perdicida* Cope, sp. nov. *Stereodectes* was stated to be based on incisor teeth, which are more solid than in existing allied genera. Its pulp cavity is almost entirely closed throughout a large part of the length of the tooth. General character similar to those of the Marmot; size that of the porcupine.

---

*Feb. 23d.*

The President, Dr. HAYS, in the Chair.

Thirty-six members present.

The report of the Biological and Microscopical Section was presented.

The following gentlemen were elected members: Wm. Dutty, Gen. Hector Tyndale, Charles Morris, Theodore Cuyler.

On favorable report of the Committee, the following paper was ordered to be published :

1869.]

## Notes on MICROSCOPIC CRYSTALS included in some Minerals.

BY ISAAC LEA.

During some years past I have given much attention to the examination of minerals under the microscope, and some of the observations were published in the Proceedings of the Academy in 1866.

About a year since, in the examination of a thin fractured piece of a large garnet from North Carolina, I was surprised to observe a number of very minute acicular crystals, which generally took two or three directions. This induced me to examine more closely into the varieties of garnets which were accessible to me, and supposing these crystals might have been observed by others, I referred to the principal works on mineralogy which have been published in France, Germany and in this country.

In none of these have I found any mention of these inclusions. But in that excellent work "Repertoire D'Optique Moderne," by M. l'Abbé Moigno, where he treats of optical mineralogy, I found that he states M. Babinet to have examined "star garnets" (*Granats asteriques*) some with four and some with six branches. He says that the star garnets with four branches are not very rare, —20 to 30 in 1000 to 1200—but that the star of six rays he found only one in 6000 specimens. Whether the filaments or fibers, as M. Babinet calls the asteroid reflections, are the same as the acicular crystals observed by me I cannot say, but certainly these latter are more common so far as my observation has extended, and I have observed no asterisms whatever.

In 154 specimens of Bohemian polished garnets, I found 48 with acicular crystals! This far exceeds the proportion stated by M. Babinet.

In the precious garnet from Green's Creek, Delaware Co., Penn., (uncut specimens), I found in the close examination of 310 specimens that 75 were possessed of acicular crystals, being nearly 25 per cent.—a very much larger percentage than mentioned by M. Babinet. Of the Brazilian *Pyrope* I examined 40 specimens. They were very pure and free from spots and cavities. I could not find a single acicular crystal in any one of them.

In *Essonite* I found no acicular crystals in the few specimens which I had it in my power to examine, nor in *grossularite*, *ouvarovite*, *colophonite* or *massive magnesium garnet*.

*Cinnamon-stone* from Dixon's, near Wilmington, Del., was carefully examined in nearly 60 specimens, none of which showed any trace of acicular crystallization.

*Spinnelle ruby*, of which I examined 28 specimens, produced no microscopic crystallized forms.

It will be difficult to ascertain what composes these microscopic crystals in garnets, but they may prove to be *rutile* when chemical analysis shall be able to resolve the difficulty.

---

March 2d.

The President, DR. HAYS, in the Chair.

Thirty members present.

---

March 9th.

The President, DR. HAYS, in the Chair.

Thirty five members present.

The following papers were presented for publication :

Third Contribution to the Fauna of the Miocene Period of the United States. By Edw. D. Cope.

[March,

On the Cetaceans of the Western Coast of North America. By C. M. Scammon. Edited by Edw. D. Cope.

Thomas Meehan presented some hickory nuts sent by Mr. W. H. Ravenel, of Aiken, South Carolina, supposed to be a hybrid between *Carya oliviformis* and *Carya aquatica*, because they were produced from trees raised from seed of the former which had trees of the latter growing near them; and because the fruit exhibited had the characters of both. Mr. Meehan said that there was a great difference of opinion amongst botanists whether the numerous forms of hickory nuts, so puzzling to botanists who attempted to classify them, were the result of hybridization, or were produced by the plant's own innate power of change by ordinary external circumstances acting on a supposed germ of form. Exact experiments were difficult, on account of the many years it would take to get at the results. He thought this instance furnished by Mr. Ravenel useful, as being one of the nearest he had known to an actual fact that hybridization has some influence on these varying forms.

Prof. Cope exhibited a specimen of the *Heloderma horridum*, of Wiegmann, from Tehuantepec, belonging to the Smithsonian Institution. He stated that the *Heloderma* of the Sonoran region proved, on comparison, to be a different species, differing in the more numerous scales on the head and body, in the shorter tail, and in coloration. He said it had been well figured by Baird in the Mexican boundary survey. He called it *H. suspectum*. He stated that though the lizards of this genus could not be proven to inflict a poisonous bite, yet that the salivary glands of the lower jaw were emptied by an efferent duct which issued at the basis of each tooth, and in such a way that the saliva would be conveyed into the wound by the deep groove of the crown.

---

March 16th.

The President, DR. HAYS, in the Chair.

Twenty-eight members present.

---

March 23d.

The President, DR. HAYS, in the Chair.

Twenty-nine members present.

The death of Jason L. Fenimore was announced.

---

March 30th.

The President, DR. HAYS, in the Chair.

Thirty-three members present.

The Report of the Biological and Microscopical Section was read.

The following gentlemen were elected members:

Col. Jas. Greer, of Dayton, Ohio, Dr. Douglas R. Bannan, U. S. N., Geo. Henszey, John Birkinbine.

On favorable report of the Committee, the following paper was ordered to be published:

1869.]

## Third Contribution to the Fauna of the Miocene Period of the United States.

BY EDWARD D. COPE.

## PLATANISTIDÆ.

A more than usually complete skeleton of *Tretosphys grandævus* furnishes some characters, which, taken in connection with others known to exist in many others species of our Miocene dolphins, suggest that the true position of all of the latter is in or near the family above named.

In the skeleton mentioned there are preserved some twenty-four ribs, more or less completely, and the anterior segment of the sternum. No pieces can be referred as osseous hæmapophyses. The sternal piece also presents no pits for articulation with such hæmapophyses, either anteriorly or posteriorly, but rugose surfaces only. The probabilities are, therefore, that these elements were cartilaginous, a feature which Flower considers to be characteristic of the family Platanistidæ. The ribs present the same type. The *capitulum* and *tubercle* are well developed to near the posterior part of the vertebral column, where they become approximated, neither disappearing more than the other. In the *Physeteridæ* the *tuberculum* disappears posteriorly, while in the *Delphinidæ* the *capitulum* vanishes. In the *Platanistidæ* both remain and become united.

The cranium of *Lophocetus* exhibits features of the same family. The pterygoids are long, flat and extended anteriorly. The cavity which they roof is long and narrow, not short and inflated as in the *Delphinidæ*. The nasals and frontals are elongate as in *Pontoporia*.\* In another cranium of uncertain reference, but probably of the same type, these elements are rather more shortened.

The species referred to this family, which are so abundant in our miocene beds, appear, so far as known, to have the cervical vertebræ all distinct, and generally much more elongate than in any recent forms. This peculiarity has been observed in *Priscodelphinus tropius*, and *P. conradi*, in *Tretosphys grandævus*, as well as in several smaller species of the family. The only cervical vertebræ referable to those of *Ixacanthus calospondylus* are less elongate, and nearly as thin as some of those of *Beluga canadensis*; the reference to that species is, however, quite uncertain. Of an even more attenuated form is the cervical of *Pontogeneus priscus* Leidy, a *Delphinoid* from the tertiary of Louisiana.

The teeth of *Tretosphys* are known, and these show some affinity to those of *Squalodon*, in the striate enamel surface, and anterior and posterior edge separating the inner and outer faces. The fang is cylindric, the crown regularly conic, the two together strongly curved.

A cast of a tooth of *Lophocetus calvertensis* is quite similar in form to the preceding, and small for the size of the animal.

Such teeth belong, perhaps, to *T. grandævus*. The muzzle of a species of similar size, also from Shiloh, N. J., is very long, narrow and depressed, the intermaxillaries forming a broad obtuse elevation. The fragments of the muzzle of *T. lacertosus*, and those of some of the Maryland *Priscodelphini* indicate a similar form. *Lophocetus* Cope presents a somewhat similar form. This genus (*Proceed. A. N. Sci.*, 1867, p. 146) will perhaps be found to be identical with one of the four which I have recognized through vertebral characters among the miocene Dolphins; but to which this reference is to be made is not as yet certain. When the portions of crania at present in my possession are carefully studied, this identification can no doubt be readily made.

The compressed roots of the teeth of *Rhabdosteus* distinguish them from those of the above genera, and constitute a point of resemblance to the existing *Platanistidæ*.

\* A fine specimen of the cranium of this species from Montevideo is in the Museum of the Academy.

## TRETOSPHYS Cope.

Proc. Acad. N. Sci., Phila., 1868, p. 186, 190.

*Delphinapterus* "Lesson," Cope, Proc. A. N. Sci. Phila., 1868, 189.

The species of this genus I formerly referred to Lesson's genus as above, the Beluga of Gray, as one of the few genera of existing Delphinidæ, in which the cervical vertebræ are all similarly distinct. I could find no characteristic feature by which to separate the two. I am, however, now entirely able to separate the miocene from the recent species, in respect to generic structure. The new genus is defined as follows, so far as known:

Cervical vertebræ elongate as in the seals, and all distinct. Their di- and parapophyses all united and embracing a small foramen for the vertebral artery.

In the existing genus the cervical vertebræ are thin and disc like, and none but the anterior one or two embrace a foramen, and that rarely. In the genus *Tretosphys* the structure is quite similar to that seen among the seals, and has given the species a physiognomy quite distinct from the modern dolphins. They have evidently had a well marked neck, endowed with considerable flexibility. This constitutes an approach to the Zeuglodontæ, which is still more marked in the genus *Priscodelphinus*. In this also there is the same elongate series of cervical vertebræ, and well enclosed cervical canal.

The species of the genus may be defined briefly as follows:

I. But few and only posterior caudals with venous foramen at base of diapophysis.

a. Posterior lumbar three-sixteenths or less, longer than wide before diapophyses.

\*\* Neural canal with obtuse epapophysial ridge.

Articular surface with incised median impression, central rugulose disc, and broad circumference with raised concentric striæ; lumbar straight and strongly keeled below; caudals short and broad; large.....T. LACERTOSUS.

Articular surface without striæ, and with a deep punctiform median impression which is below the middle; most lumbar concave below; caudals more elongate, 35 lines long in young; smaller.....T. GRANDÆVUS.

Articular face without striæ, and with punctiform impression (on caudal); caudal stouter, 24 lines long in adult; smallest.....T. GABBII.

aa. Posterior lumbar  $\frac{1}{3}$  longer than width before diapophyses.

Articular face with punctiform impression, and no raised striæ; an epapophysis; caudal narrow, 39 lines long in adult.....T. URAEUS.

II. An anterior caudal with vascular foramen at base of diapophysis.

Articular face of lumbar with weak incised impression, smooth; below weakly keeled; length in adult 21 lines; the smallest species.

T. RUSCHENBERGERI.

The species which I described as *Delphinapterus tyrannus* (Proc. A. N. Sci. Phila., 1868, 189,) probably belongs to the toothless whales, and would correspond in size with the *Eschrichtius pusillus*. The collation of different parts of each of these species must be left for future opportunities. The vertebræ are distinguished by having the neural canal without epapophysis, the articular face with open median impression, and no striæ. The epiphysial ridges are much interrupted and slightly tuberculiform.

TRETOSPHYS LACERTOSUS, *Delphinapterus (Tretosphys) lacertosus* and *D. hawkinsii* Cope, l. c. p. 190.

This species is known by portions of two individuals from Charles Co., Maryland, of one from the mouth of the Patuxent, and of five at least from the marl pits of John Hummel, Henry Ware and others, near Shiloh, Cumberland Co., N. J. Portions of crania with teeth, etc., are mingled with the vertebræ, and furnish material for a partial analysis of the characters of the species.

1869.]

TRETOSPHYS GRANDÆVUS Cope. *Delphinapterus grandævus* Cope, Proc. A. N. S. 1868, 191. *Priscodelphinus grandævus* Leidy, l. c. 18, 51, 327.

The caudals of this dolphin were the parts of it first discovered. Since then a lumbar of one, and a large part of the skeleton of another individual have been received by the Academy, all being from the same locality, Shiloh, Cumberland Co., N. J. Unfortunately the last series contained no caudal vertebræ; its reference to this species is not entirely established, though the correctness of the same is very probable.

The remains of the most perfect individual consist of seven cervical, nine dorsal, and seven lumbar vertebræ; there are twenty-four ribs and the anterior element of the sternum. The distinctive features of the vertebræ have been already given. The manubrium of the sternum is T-shaped, and is somewhat expanded posteriorly. The anterior (inferior) face is plane, (slightly concave antero-posteriorly); the margins rounded. The superior face is roof-shaped to a median keel, which disappears posteriorly.

TRETOSPHYS GABBII, *Delphinapterus gabbii* Cope, l. c. 191.

No material characteristic of this species has been found since its description.

TRETOSPHYS URÆUS Cope, sp. nov.

This species is established on a lumbar vertebra from the miocene of Shiloh, Cumberland Co., N. J., with which I have associated a caudal vertebra from near the mouth of the Patuxent, which was lent me for determination by Philip P. Tyson, State Geologist of Maryland.

The character of elongation seen in the genus *Zarhachis* strikes the eye at once in this species. Although not carried so far as in that genus, it exceeds considerably species of this, or of *Priscodelphinus*, with which we are acquainted; hence, though the material is slight, there can be no doubt that it represents an animal not previously known.

The articular face of the lumbar is not complete in all its outlines, but has evidently been as deep as wide, and perhaps nearly round. The median impression is punctiform and remarkably strong. The profile of the inferior outline is concave and is constituted by an obtuse keel, on each side of which is a short longitudinal depression. The diapophyses have been broken off, but their bases are both broad and deep, slightly filling the concavity of the infero-lateral face. Supero-lateral face strongly concave in both directions.

	Lines.
Length of centrum.....	39
“ “ basis neuropophysis.....	28·5
“ “ basis diapophysis.....	20
Width neural canal.....	4

The caudal has broad diapophyses and the band-like impression passing in front of them, and converging the centre of the median line below, a character seen in many species of the genus. The points of attachments of chevron bones are well marked; they entirely disappear on the middle portion of the centrum. The articular face is similar to that of the lumbar, but is a little broader than high. The surfaces are everywhere concave, and are not marked by any longitudinal ridges.

The same vertebræ of *T. grandævus* present many ridges; those of *T. lacertosus* are variable.

	Lines.
Total length.....	39
Length basis neuropophysis.....	25
“ “ diapophysis.....	24
Width neural canal.....	2·6
“ articular face.....	25·5
Depth articular face.....	21·3

This is probably the second of the genus length, and the third in bulk.

[March,



TRETOSPHYS RUSCHENBERGERI, *Delphinapterus ruschenbergeri* Cope, Proc. A. N. Sci., Phila., 1868, 189.

This is the smallest of the genus. It is known only from a caudal and lumbar vertebra of one individual, from Charles Co., Maryland.

ZARHACHIS Cope.

Proc. A. N. Sci. 1868, 189.

Examination of additional material renders it necessary to correct the characters of this genus as originally given. It was stated to differ from Priscodelphinus in that, while some caudals had spinous diapophyses, others possessed them flat, but imperforate. A vertebra supposed to indicate the latter characters I am now compelled to refer to another species and probably a genus. Other vertebræ assigned to *Z. flagellator*, must be referred elsewhere. A lumbar vertebra represents another species of probably the same genus, while a third has evidently pertained to still a third species. The genus will be characterized by the extraordinary length and slenderness of the lumbar vertebræ, and similar, though slightly abbreviated form of the caudals. The latter have spinous diapophyses, and in one species the former also. While the width of the articular faces of the centra of these vertebræ in the typical Priscodelphinus is but few lines less than the length, in the species of this genus the diameter of the same is only from four-sevenths to one half the length. The nearest approach is made by Priscodelphinus *stenus*, m., where this diameter is 6-7ths of the length.

The three species of Zarhachis may be distinguished as follows:

I. Median or anterior caudal with a strong longitudinal keel above the diapophysis—which is therefore probably present on the distal lumbar.

Epiphysis thicker, larger..... *Z. FLAGELLATOR*.

II. No longitudinal keel on lumbar. Diapophyses broad, flat; epiphyses thin; large..... *Z. TYSONII*.

Diapophyses narrow, subspinous; epiphyses thin; small..... *Z. VELOX*.

ZARACHIS FLAGELLATOR Cope, Proceed. Acad. Nat. Sci., Phil., 1868, 189, pars.

The caudal vertebra, described as above, is the only indication which we have as yet of this large adolphin.

Miocene, Charles Co., Md.

ZARHACHIS TYSONII Cope, sp. nov.

This species is established on one posterior lumbar vertebra only, but its form is so characteristic as to render its identification a comparatively simple matter. The attenuated form characteristic of the genus is accompanied by broad diapophyses, showing that, as in Priscodelphinus, the species differ in the number of the posterior vertebræ which exhibit the contraction of the diapophyses.

The specimen preserved belonged to an adult animal. It was apparently one of the most posterior lumbar, as there are two feeble longitudinal ridges beneath, whose interval is again obtusely ridged and perforate by several foramina. The inferior outline is strongly concave in longitudinal section, and all the planes are concave in transverse section. The articular faces are a little wider than deep. The neuropophyses occupy a base of 75 the length of the centrum. The diapophyses are about equidistant between them and the nearest inferior ridge.

	Lines.
Total length centrum.....	48
Transverse diameter articular face.....	29
Vertical " " ".....	27
Width neural canal (internal).....	5
" between inferior ridges.....	8

This specimen was found at the miocene beds at the mouth of the Patuxent River, Maryland. It is water worn, and has been probably washed from the cliffs, and been covered by the tide.

1869.]

The animal to which it belonged was not less attenuated in the posterior part of the vertebral column than the great *Basilosaurus*.

*ZARHACHIS VELOX* Cope.

This species is likewise only represented by a single vertebra, which is from the lumbar series anterior to the position of that of *Z. tysoni* just described. It has pertained to an adult animal of half the size of the preceding, and one which carried the narrowed subspinous diapophyses forward, though perhaps not so markedly as the *Priscodelphinus spinosus*, m.

The inferior outline is straight, and is the edge of a very strong thin keel, whose greater median prominence is due to the strong concavity of the inferior surfaces. The same concavity with that of the upper surface causes the existence of a strong longitudinal lateral keel, from the middle of which springs the diapophysis. The basis of the neural arch is thin and does not extend over more than  $\frac{1}{6}$  the length of the centrum.

The articular faces are discoid, and if one diameter exceed another it is the vertical; they have a somewhat expanded appearance from the concavity of the sides. Surfaces smooth.

	Lines.
Length centrum.....	33
Transverse diameter of extremity.....	17
Vertical " ".....	17
Internal width of neural canal.....	3.1
Length of basis of diapophysis.....	8

This species was taken from the miocene marl from the pits of Reuben Ayers, near Shiloh, Cumberland Co., N. Jersey.

It indicates an even more slender and snake-like cetacean than the preceding, of much smaller size.

*ESCHRICHTIUS* Gray.

There is in the Thomas collection a portion of the cranium of a small *Balænoïd*, which from its resemblance to those of the existing finner whales, its small size, locality, and black color, I attribute provisionally to the *Eschrichtius pusillus*. It serves to confirm the affinities expressed in the name established on the ramus of the mandible. The alisphenoids present a deep, smooth posterior excavation, as in *Sibbaldius*, while the infero-lateral processes of the basioccipital are stronger than in that genus. The conchs of the petrotic bones are preserved; they are characterized by the possession of a hooked process turned outward, on the outer and more elevated margin.

An examination of additional material of these extinct *Balænidæ*, has enabled me to trace the affinities of species of which little has been hitherto known. Thus the *Balæna prisca* Leidy appears nearly affined to species referred by me to *Eschrichtius* through intermediate forms. Vertebrae very similar to those referred to the *Megaptera expansa* Cope are accompanied by mandibular rami of the same general type, and would be better referred to the same genus, in the absence of evidence to the contrary. It appears that there are six species of the genus, whose characters offer nothing as yet to separate them from the scarcely extinct type *E. robustus* Lillj. Five of these can be characterized from the forms of their mandibular rami, and are therefore compared in the following table. The other species, *E. leptocentrus*, m., is indicated by vertebrae alone.

Much compressed, outer face little convex; superior margin a narrow ridge without any truncation, with a series of foramina on each side, the inner extending for a very short distance only; no marginal groove; inferior edge narrow. Very large..... *E. CEPHALUS*.

Upper edge broad, with outer series of foramina, and meeting inner-edge at a right angle, which is the highest line, and with inner series of foramina just below it; most convex externally. Large..... *E. PRISCA*.

[March,

Upper edge broad behind only, and these bearing only the *inner* series of foramina. Elsewhere with a median ridge and rows of foramina below on each side; much decurved; less convex externally. Medium... *E. expansus*.

Upper edge nowhere broad, and with a deep or shallow groove below it on inside; less decurved, less convex externally; small..... *E. pusillus*.

*ESCHRICHTIUS LEPTOCENTRUS* Cope, Proceed. Ac. N. Sci., Phil., 1867, 147.

The largest of the miocene species, the vertebræ considerably exceeding corresponding ones of the *E. cephalus*.

*ESCHRICHTIUS CEPHALUS* Cope, loc. cit. p. 148.

Indicated by a large part of the cranium and other parts of the skeleton, with flipper, etc., from Charles Co., Md., and by a portion of the mandible of a second individual from near the mouth of the Patuxent River, Md.

*ESCHRICHTIUS PRISCUS* Leidy. *Balæna prisca* Leidy, Pr. A. N. S. Phil., 1851, 308. *Balanoptera prisca* Cope, l. c. 1867, 144.

A portion of a mandibular ramus of this species furnishes all that we know of it. In size it is intermediate between the two here preceding and following it.

The miocene of Westmorland Co., Va.

*ESCHRICHTIUS EXPANSUS* Cope. *Megaptera expansa* Cope, l. c, 1868, 193.

In addition to numerous vertebræ, portions of the limbs and of three mandibular rami of two individuals have been discovered. The latter present, for a marked distance on the proximal portion, a flat plane on the upper face, instead of the usual argulate ridge, which is equally distinct from the outer and inner faces. In *E. priscus* the superior plane is only a continuation of the outer convex face, and accordingly the external series of nutritive foramina extends along it. The plane is occupied on the other hand, in the *E. expansus*, by the inner series.

The inferior margin is a rather obtuse angle; the general form is not compressed, nor much convex externally, as in *E. priscus*.

	Inches.
Depth ramus.....	2.75
Thickness ".....	1.65
Foramina (internal) two in.....	2.50

From the mouth of the Patuxent, coll. of P. T. Tyson, State Geological Survey of Maryland.

*ESCHRICHTIUS PUSILLUS* Cope, Proceed. Acad. Nat. Sciences, Philada., 1868, 159, 191.

A ramus of the mandible of this species from the mouth of the Patuxent River differs from the type in having the inner groove of the superior margin much less marked; the inner face is plane, but leaves the superior groove with a marked convexity. The outer face is gently convex, and the outer foramina open externally. Slightly decurved, as well as curved longitudinally. Behind the foramina, the superior margin rises to a well marked base for a coronoid process, which is not preserved.

	Inches.	Lines.
Depth ramus.....	1	10.5
Thickness.....	1	2.5
Foramina (internal) intervals.....	1	

## CROCODILIA.

### THECACHAMPSA Cope.

Further investigation shows that this genus is gavial-like, and that the peculiarity which characterizes its dentition also belongs to *Plerodon* Meyer of the European Miocene. *Thoracosaurus*, of the American Cretaceous, presents also the same character. *Plerodon* differs from the American form in 1869.]

being like *Crocodylus* in cranial characters, while *Thecachamps*a is a gavial. The species of the latter are *T. SERICODON* Cope, abundant in New Jersey, at Shiloh and elsewhere, with long curved cylindric teeth. *T. SICARIA* Cope, from Maryland, with much compressed crown of the tooth, with prominent cutting edges. *T. ANTIQUA* (*Crocodylus* Leidy,) with teeth less curved, cylindric and with very short cutting ridges. From Virginia.

The characters of the three species may be thus compared :

- The crowns of the teeth not compressed, with short cutting edges. *T. antiqua.*
- Crowns cylindric, curved, with long and delicate cutting edges. *T. sericodon.*
- Crowns compressed with very prominent crenulate cutting edges, on a marginal base..... *T. sicaria.*

The last named also possesses a large maxillary tooth, near the position of the ninth of *Crocodylus*, which fits a corresponding concavity between two of the mandibular teeth, resembling in this the existing genus *Tomistoma*.

TESTUDINATA.

TRIONYX Geoff.

*TRIONYX LIMA* Cope, sp. nov.

Represented by one costal-bone from Shiloh, N. Jersey. It is massive, and strongly sculptured by numerous approximated narrow raised ridges, which extend across the bone, with little insolation, and which leave intervals between them a little wider than themselves.

The characters may be compared with those of the three species from the cretaceous of New Jersey, as follows :

- Costal bone transversely figured by narrow elevated ridges..... *T. lima.*
- Costal bone with thick, low, transverse ridges, which are connected by cross-ribs which leave series of pits..... *T. priscus.*
- Costal bones with transverse irregular grooves proximally which remain along the sutures only distally, leaving an area of a shallow honey-comb pattern medially..... *T. pennatus.*
- Costal bones with a shallow coarse honey-comb pattern, tending to confluence distally ..... *T. halophilus.*

April 6th.

The President, DR. HAYS, in the Chair.

Twenty-six members present.

The following papers were presented for publication :

Notice of some Extinct Vertebrata from Wyoming and Dakota.  
By Jos. Leidy, M. D.

Description of new Crinoidea and Echinoidea from the Carboniferous Rocks of the Western States, with a note on the Genus *Onychaster*. By F. B. Meek and A. H. Worthen.

Remarks on the Blastoidea with descriptions of new species. By F. B. Meek and A. H. Worthen.

The publication of the fifth number of the Proceedings for 1868, was announced.

April 13th.

The President, DR. HAYS, in the Chair.

Twenty-two members present.

[April,

*April 21st.*

DR. BRIDGES in the Chair.

Fifteen members present.

Mr. Redfield called the attention of the meeting to the following Memoranda attached to specimens of *Schizæa pusilla*, in the Herbarium of N. Y. Lyceum of Nat. Hist.

"First discovered by Dr. C. W. Eddy, near Quaker Bridge, in the pine barrens of New Jersey, about 30 miles from Philadelphia. Dr. E. was in company with J. LeConte, Pursh and C. Whitlow, and though he and Mr. LeConte found all the specimens, Pursh has claimed the honor of the discovery himself."

Signed,

TORREY AND COOPER.

1868.

Above is in handwriting of Dr. Torrey.

"First found in 1805; not found again till detected by me in company with Dr. Torrey, in June, 1818."

Signed,

COOPER.

*April 27th.*

The President, DR. HAYS, in the Chair.

Twenty-three members present.

The issue of the sixth number of the Proceedings for 1868 was announced.

The following gentlemen were elected members:

Isaac S. Fogg, John C. Sinclair, Rev. J. L. Withrow and Henry Bower.

The following were elected correspondents:

Albany Hancock, of New-Castle-upon-Tyne, England; and Brevet-Major F. Curtis, M. D.

On favorable report of the Committees the following papers were ordered to be published:

**On the CETACEANS of the Western Coast of North America.**

BY C. M. SCAMMON, UNITED STATES MARINE.

Edited by EDWARD D. COPE.

*Introductory note by the Editor.*

The present article, by Capt. Scammon, is the result of many years' observation in an almost unexplored and with difficulty explorable department of zoology. It was submitted by the author to the Smithsonian Institution, with the request that it might be rendered beneficial to science. The Secretary, Prof. Henry, referred it to the editor, with a request to publish such parts as should be deemed valuable to zoology, and to add such elucidation and explanation as would contribute to the same end.

In the carrying out of these views of the Secretary of the Smithsonian Institution, a general classification has been made, and a systematic record of the species and genera mentioned in the essay has been prefixed. A few species have been inserted from other sources, and the opportunity improved to give descriptions of some species from the Atlantic coasts.

1869.]

The scientific student will await with interest the receipt by our national institution of further materials, so that the structure and affinities of these remarkable beings may be fully made known.

## PART I.

## SYSTEMATIC SYNOPSIS

*Of the species of the Cetaceans of the West Coast of North America. By Prof. E. D. COPE, Corresponding Secretary of the Academy of Natural Sciences of Philadelphia.*

## CETACEA.

Two sub-orders of this order are known to exist at the present period, which differ as follows :

## MYSTICETI.

Mandibular rami distinct from each other, without symphysis. Teeth none in either jaw. A series of transverse corneous laminæ on each side of the roof of the mouth.

## DENTICETI.

Mandibular rami united distally by a symphysis. Teeth present in one or both jaws. No corneous laminæ in the mouth.

## I. MYSTICETE.

There is but one family of this group, characterized as follows :

Spiracles two. Front of cranium plane, much raised above the orbital processes; no transverse or longitudinal crest on the cranium..... *Balænidæ*.

## I. BALÆNIDÆ.

Of this family numerous genera and species have been discovered and described. It embraces the most gigantic of vertebrated animals, and some of the most useful. They inhabit all oceans, but are rarer in the equatorial regions, abounding most in the frigid and temperate seas. Their pursuit gives occupation to many men of all nations.

Owing to their vast bulk and the want of appreciation on the part of those who are engaged in their capture, their study has been one of great difficulty. It is only within a few years that a sufficiently extended amount of material has been accumulated to enable the genera and species to be properly discriminated. The works of Gray, Eschricht, Reinhardt, Lilljeborg, Van Beneden, Flower and the writer, contain the most recent results of these investigations.

The genera are as follows :

- I. Cervical vertebræ coössified; fingers five.  
 No dorsal fin or gular folds; coracoid rudimental.  
 Ribs single headed.....*Balæna*.  
 First rib double headed.....*Hunterius*.
- II. Cervical vertebræ free; fingers four.  
 A. The throat without plicæ; no dorsal fin; ribs? single headed.  
 No acromion.....*Rhachianectes*.  
 Au acromion.....*Agaphelus*.  
 B. Throat and breast plicate; a dorsal hump or fin.  
 a. The vertebral canal not closed by the processes of the cervical vertebræ; ribs single headed.  
 No acromion.....*Megaptera*.  
 A well developed acromion.....*Eschrichtius*.  
 aa. The canalis vertebralis enclosed by diapophyses and parapophyses of cervical vertebræ; both acromion and coracoid.

[April,

Anterior ribs single headed.....*Balænoptera*.  
 Anterior ribs double headed.....*Sibbaldius*.

Those engaged in the pursuit of whales recognize these natural groups without difficulty, as evidenced by their vernacular names of long standing. Thus the species of div. I are "right whales," of II A, "scrag whales;" of II B  $\alpha$ , "humpback whales;" and the *Balænopteras*, etc., "finner whales." The last are most numerously represented by species.

## BALÆNA Linn.

Two species of this genus have been described by authors as inhabiting the North Pacific Ocean, though the materials upon which their identification has been based is of the most slender description. I am as yet unable to determine to which of them the right whale mentioned by Capt. Scammon should be referred. I therefore enumerate both here. A third species, the Bow Head of American whalers, is stated to pass south of Behring's Straits at certain seasons of the year, according to Capt. Scammon. I enumerate it as the same as the Greenland Right Whale of English authors, which is the "bow-head" of the Eastern American whalers, in contradistinction to the Right whale, (*B. c i s a r c t i c a*).

## BALÆNA MYSTICETUS Linn.

Bow-head. Catal. Whales and Seals, Brit. Mus. p. 81.

## BALÆNA SIEBOLDII Gray.

Cat. B. M. 96, *Balæna australis* Temm. Faun. Japon. t. 28, 29, (from Japanese model).

## BALÆNA CULLAMACH Chamisso.

Nova Acta, Acad. Curs. xii, 251 Tab. (from Aleutian model). Cope, Pr. A. N. Sci. Phil. 1868, 225.

## RHACHIANECTES Cope.

This genus is now first characterized. Its only known species I originally united with *Agaphelus* Cope, but the form of the scapula is so different that it must be distinguished. While that of *Agaphelus* is identical with that of *Balænoptera*, it is in the present genus quite like that of *Balæna*.

## RHACHIANECTES GLAUCUS Cope.

*Agaphelus glaucus* Cope, Proceed. Academy Nat. Sciences, Philada. 1868, p. 225. The California Gray Whale.

This species was originally described from specimens by Wm. H. Dall, of San Francisco.

## MEGAPTERA Gray.

In this genus the rudiment of a dorsal fin exists as a hump on the posterior part of the dorsal region. The fins are longer than in any other genus, and two or more of the cervical vertebrae are occasionally more or less coössified. The following species are known more or less imperfectly: *M. longimana* Rudolphi, from the Arctic Seas; *M. osphyia* Cope, from the Western Atlantic; *M. brasiliensis* Gray, (*Balænoptera* Gray), from the coast of Brazil; *M. lalandii* Fischer, from the Cape of Good Hope; *M. kuzira* Gray, from the Western Pacific. The full measurements and description of Capt. Scammon enable me to add another species, viz.:

## MEGAPTERA VERSABILIS Cope.

Spec. nov. The North Pacific hump-back.

This species possesses pectoral fins, apparently intermediate in length between those of the *M. longimana* and the species with shorter fins, as *M. 1869.*]

osphya and *M. kuzira*. They are between one-third and one-fourth the length; in the two last mentioned, between one-fourth and one-fifth. It has 26 pectoral and gular folds. Siebold states that the *M. kuzira* possesses but ten. In this animal the warts extend to the top of the front, a character not ascribed to any Atlantic Megaptera. It differs also from *M. longimana*, and resembles *M. lalandii* and *M. kuzira*, in having the pectoral black on the external face; in the Greenland species and in the model of the Aleutian Islanders, described by Chamisso, it is white. The characteristic color of the belly, in the most typical form, is said to be entirely black. In this respect it differs from all other Megapteræ, which present more or less white or grey, on the inferior surfaces at least.

#### BALÆNOPTERA Lacep.

Many species of this genus inhabit the immense area of the ocean. They are regarded as pertaining to two genera by Gray. Thus the known species fall into two groups, viz.: I, those in which the dorsal fin is at the commencement of the third fourth of the length from the head; and II, those where this fin measures only the second third. To the first belong certainly only *B. rostrata* and *B. velifera*; to the second *B. physalus*, *B. duguidi* and *B. sibbaldii* Gray (*Cuvierius* Gray), all Atlantic. There is not enough known of the following species to determine their characters in this respect: *B. arctica* Schlegel, N. West Pacific; *B. swinhoei* Gray, China Seas; *B. patachonica* Gray, S. W. Atlantic; *B. antarctica* Gray, New Zealand Sea. The following species have been named: *B. fasciata* (*Physalus* Gr.), *B. australis* Desmoul. The species of the North West coast of North America is sufficiently described and figured by Capt. Scammon to furnish means of comparison with most these species. It differs from these, and may be called

#### BALÆNOPTERA VELIFERA Cope.

The Finner Whale of the Oregon coasts.

This species differs from all that have been described in that respect, in the color of the baleen; from the *B. arctica* of the Japanese Seas, the coloration of the body separates it; in the latter the sides are spotted black and white, in the present shaded from the brown of the upper to the white of the lower surfaces. The large size of the dorsal fin and its anterior position are marked characters; the northern species, with larger fin, is still more different from the *B. arctica*, the only one with which it would be probably identical.

The more southern form, with very small fin, may be another species—possibly a *Sibbaldius*. The *B. velifera* cannot unfortunately be compared with the *B. swinhoei* and *B. patachonica*, as no similar parts are figured or described.

The baleen, says Capt. Scammon, is of a light lead color, streaked with black, and its surface is marked with transverse roughening. In the *B. physalus* the whalebone is, according to Gray, slate-colored on the inner side, white streaked; on the outer side nearly black and with still darker streaks. In the *B. rostrata* it is nearly all white, with some black at the base.

#### SIBBALDIUS Gray.

Species of this genus have been discovered in arctic, antarctic and tropical seas. *S. borealis* (*Flowerius* Lilljeborg), the most gigantic of the finners, occurs in the northern Atlantic and Polar Seas, but appears to be rather rare. *S. laticeps*, a much smaller species, has, so far as known, a high arctic range, while *S. tuberosus*, sp. nov., has been found on the eastern North American coast. *S. schlegelii* is known to occur on the coast of Java. A doubtful species has been named *S. antarcticus*. The species may be divided into three groups, thus: 1, the dorsal fin of ordinary form, two-thirds

[April,



the length from the muzzle; dorsal line behind it smooth. *S. tectirostris* Cope, *S. laticeps* Gray. II, the dorsal a small conical mass, situated well posteriorly; the dorsal line with several humps behind it; several cervicals with complete cervical canal; *S. tuberosus* Cope. III, the dorsal fin a small conic mass situated three-fourths the length from the muzzle, the dorsal line smooth behind it; the axis only, with complete cervical canal; (*Flowerius* Lillj.) *S. borealis* Fisch.

The *S. TUBEROSUS* m. differs from the *S. laticeps* as above, and probably in its five or six humps above the caudal portion of its vertebral column. The latter peculiarity is not mentioned in authors' descriptions of *S. laticeps*, and though its existence is not denied, it is probably wanting. I have heretofore considered this whale as the latter species, and described it as such.—*Proceed. Acad. Nat. Sci. Phila.* 1866, 297.

The finer whale, above mentioned as *SIBBALDIUS TECTIROSTRIS* Cope, is established on a nearly complete specimen of a young ♀ in the Museum of the Academy. Its length when fresh, in a nearly straight line from the end of the muzzle to the emargination of the flukes, is between 47 and 48 feet. This depends on independent observations of several persons. The skeleton as preserved lacks a number of caudal vertebræ\* and a few dorsals. Restoring those that are at present wanting, from the obvious extent of interruption, and the last caudals, according to Flower's estimates for the *S. laticeps*, we have the following total length:

	No.	Length. ft. in.	Restored. ft. in.
Cervicals.....	7	2 6	0 0
Dorsals.....	11		2 0
Lumbosacrals*.....	16		0 0
Caudals—diapophyses perforate.....	4	28 10	0 0
“ —diapophyses imperforate.....	10		1 0
“ —no diapophyses.....	1	3	0 6
Cranium.....		10 0	
		<hr/>	<hr/>
		41 7	3 6
Restored.....		3 6	
		<hr/>	<hr/>
Total.....		45 7	

The individual is in the young stage, since not only are all the epiphyses of the vertebræ separated, but those of the humerus also. According to Flower, the coössification of the epiphysis of the humerus takes place when the animal has developed somewhat beyond one-half the adult dimensions. This animal may therefore be considered as being at least half grown, which renders a length of 70—80 feet probable for the adult. The present specimen was a female, according to those who had seen it in the flesh, and who described to me the mammae and the vulva. In its larger dimensions it thus exceeds the *B. laticeps*, and especially the *B. tuberosus*, as the latter is adult at about the size of this young specimen.

The atlas has not yet reached the Museum. The axis presents below no surface adapted to a *tuberculum atlantis*. The median portion of the anterior face of the centrum presents a low conic projection, the *processus ontoideus*. The di- and parapophyses are united distally, embracing a large ring, whose outside longitudinal diameter is two-thirds the transverse diameter of the centrum of the same. The neural arch presents no spine, but a pair of lateral prominences like rudimental zygopophyses. The parapophyses of the remaining cervicals are long, except on the seventh, where they are almost wanting. The diapophyses are long in all, longest and decurved on the seventh, where it

\* All are in possession of the Academy, but those alluded to are yet in a compost heap and unfit to handle.

stands above the parapophysis of the sixth. They are nearly united with the parapophysis on the third cervical, and are no doubt fully so in mature age. The fourth cervical is lost, but it is scarcely probable that it presented a complete ring for the transmissal of the vertebral artery, etc. There are no rings attached to the vertebrae from the fifth inclusive. The centra are all transversely oval.

	Inches.
Height centrum and arch of axis.....	12.25
“ centrum.....	7. 1
Transverse extent of axis.....	25.
“ “ centrum of do.....	11. 5
“ “ neural canal.....	5.75
“ “ of third cervical.....	23.
“ “ centrum do.....	11.
Length parapophysis sixth cervical.....	5.
Vertical diameter centrum (? 5th) dorsal .....	7.
Length centrum do.....	6.
Vertical diameter centrum second caudal, with perforate diapophyses...	10.5
Length centrum do... ..	10.5
Height spine and arch middle lumbosacral.....	14.5
“ from floor canal to top anterior zygapophysis do.....	6.

There is no neural spine on the second, third and fourth cervicals, and it is rudimental and small on each of the remainder. Those of the dorsals and lumbar are not particularly elevated.

The humerus is very short and thick, and the hand remarkably small.

The scapula, as in other *Sibbaldii*, has considerable antero-posterior extent, and well developed acromion and coracoid. The disk is divided into three areas on the inside, by two slight ridges.

#### *Dimensions.*

	Inches.
Antero-posterior width.....	33.
Vertical “ .....	21.
Length acromion.....	7.5
“ coracoid.....	4.5
Diameter of glenoid cavity.....	8.

The muzzle is elongate, and with a narrow acumination. The supraorbital plates of the frontal are

Each nasal is as wide as long medially; anteriorly concave above, the line of junction of the two in one plane, forming a median ridge, which is prolonged into a prominent median point. The otic bullae are slightly compressed and carinate below, and their surface is not markedly rugose. The malars are in shape something like first ribs; that is, with an enlarged head, with prominences imitating capitulum and tubercle, a short narrowed shaft, and expanded distal extremity. The distal third is occupied by an ovate ? articular surface, thinning out the margin on one side. The shaft is thin and concave, both longitudinally and transversely, on one side.

The inner margin of the palatine bones is regularly continuous with the short pterygoids, which are very short, and do not approach near the otic bullae; Rudolphi represents the latter as prolonged to beyond the extremity of the bulla. The posterior plate of the vomer in *S. tectirostris* extends much further posteriorly than Rudolphi represents for the *S. laticeps*, and though there is no doubt some variation in this respect in the same species, the difference is here very considerable. In *S. laticeps* it extends to a little behind the anterior margin of the bulla; in *S. tectirostris* to behind the posterior margin, concealing much of the basioccipital.

The mandibular ramus is strongly curved, and very convex externally, less so internally. The vascular foramina are very large externally, and very much reduced in size on the inner face. The coronoid process is strongly elevated,

[April,

curved outwards, and acuminate. There is a distinct angular process below the condyle.

*Measurements.*

	Ft.	In.
Length of cranium (axial).....	10	6
Greatest width of occipitals.....	3	7
Width at supraorbital plate.....	4	4
“ of each maxillary at middle.....		9.75
“ of supraorbitals above orbit.....		13
“ (least) of frontal region.....		13.5
“ of nasals.....		4.3
“ intermaxillaries at middle.....		5.3
Length nasal.....		6
“ malar.....		6
“ maxillary above.....	7	6
“ ramus mandibuli (in curve).....	10	
“ “ “ to coronoid.....		19
Depth “ “ at condyle.....		8.5
“ “ “ at coronoid.....		13
“ “ “ at middle.....		9
Length otic bulla.....		5.2

The baleen is short, and of a dark lead color, the inner and shorter margin white for varying widths. The bristles are fine for the size of the animal, and not nearly so coarse as in Megaptera o s p h y i a or Rhachianectes g l a u c u s.

Length of longest plates with gum.....	In.	15
Width at base.....		10
No. plates in four inches.....		10
Whole number plates on one side, 126 preserved—add about 24 lost from extremity.....		150

Most of the ribs are yet in process of cleaning, and will be introduced into the final monography and illustration of the North American Cetacea in course of preparation. That which by its deeply bifurcate head indicates the generic affinities of the species, is in form much like the first of *S. laticeps*. It measures in

	Ft.	In.
Total length.....	3	
Distal width.....		7.25

The anterior head is the narrower, and its line of junction with the posterior extends to near the middle of the length of the same.

The animal's color above was a uniform black; the exterior face of the flippers and stripes along the gular plicæ were also black. The belly was white, separated, according to my informant, from the black abruptly, forming a "water line." The posterior face of the flippers white for the distal half. The under side of the caudal fluke white also. These points I derived from Joshua Carey, who stripped the carcass.

The dorsal fin was not seen by me, but was described by a number of parties, whose statements agreed. It was of the usual form and elevation common among finner whales, compressed, with a long base, and eighteen inches in height; the dorsal line behind it clean and smooth.

The species appears to be most nearly allied to the *S. laticeps* of Gray, of the Arctic Seas. It differs distinctly in the following points: 1. The nasal bones of the latter are longer, more parallelogrammic, and not strongly keeled and mucronate. 2. The coronoid process of the mandible is less elevated. 3d. The cervical vertebrae, including the axis, are furnished with well developed spinous processes. 4. The mandibular ramus is more compressed. 5. The vomer is more, and (6) the pterygoids are less prolonged posteriorly.

The difference from the *S. tuberosus* is found in the form of the dorsal  
1869.]

fin and character of the dorsal line; it is marked, and of a kind which Lilljeborg has regarded as generic in the case of *S. gigas* (*S. borealis*), but which appears to me to be specific in this case. This species is distinctly smaller than the *S. tectirostris*, and presents a *tuberculum atlantis* articulating with the *epistrophæus* below, which is not indicated by the latter in *S. tectirostris*.

In many respects the species appear to be quite similar. The deposit of the specimen of *S. tuberosus* in the Museum of the Academy having been delayed, the nearer comparison must be made when it arrives, which will be in a short time, it is anticipated.

As compared with the *S. gigas* there is a marked difference in the form of the nasal bones, if Dubar is to be relied on; he represents them as even more elongate than in the *S. laticeps*. The first rib of this animal is apparently much wider. The annulate cervicals are less numerous. The dorsal fin has a different form and position.

The type of the *S. tectirostris* came ashore during the winter of the present year, on the coast near Sinepuxent Bay, on the Maryland peninsula. It had been dead some time; the stomach contained but little, and that a mixture of finely divided scaly and stringy material, not readily recognizable. Bottles dropped at numerous points off the coast of Maryland and Virginia by the Coast Survey, were always carried ashore in the course of a few days or weeks, to the south-west of the point where dropped. It is therefore probable that this whale is a native of the ocean from which it drifted, and that it is one of the "fin-backs" of the Western Atlantic.

The species described by Capt. Scammon, if of this genus, belongs to the sub-group of the *S. borealis*, so far as the proportions and position of the dorsal fin are concerned; the cervical vertebrae are not yet known. Its size would also distinguish it from the species of the other groups, as well as from the *S. schlegelii* Flower, from the Malaysian Seas.

#### SIBBALDIUS SULFUREUS Cope.

The Sulphur-Bottom of the North West Coast.

This immense whale is as yet too insufficiently known to be distinguished as fully as desirable, but the marked peculiarity of coloration separates it from the only species with which a comparison is necessary—the *S. borealis* or *gigas* of the North Atlantic. Capt. Scammon describes it to be a gray or brown above, paler than in the *Balanoptera velifera*, and beneath, a sulphur yellow. Length from seventy to ninety feet. The colors of the *S. borealis* are described as polished black above, milky white beneath, by Dubar.

#### DENTICETE.

Three families of this order are known, which differ as follows, according to Flower:

Costal cartilages not ossified. The hinder ribs losing their tubercle and retaining their capitular articulation with the vertebrae. The greater number of the cervical vertebrae ancylosed together. Pterygoid bones thick, produced backwards, meeting in the middle line, and not involuted to form the outer wall of the postpalatine air-sinus..... Physteridæ.

Costal cartilages not ossified. The tubercular and capitular articulations of the ribs blending together posteriorly. Cervical vertebrae all free. Pterygoid bones thin, not conforming in their mode of arrangement with either of the other sections..... Platanistidæ.

Costal cartilages firmly ossified. Posterior ribs losing their capitular articulation, and only uniting with the transverse processes of the vertebrae by the tubercle. Anterior (2—6) cervical, in most, ancylosed together. Pterygoid bones short, thin involute, to form, with a process with the palatine bone, the outer wall of the postpalatine air-sinus..... Delphinidæ.

[April,

DELPHINIDÆ.

This family is most numerously represented by species in the order. The genera are also numerous. Those represented in the ocean bordering North America are the following:

I. The phalanges numerous.

Pectoral fins, long narrow, on the lower part of the sides; cervical vertebræ consolidated; the teeth few, obtuse; dorsal fin .....Globocephalus.

II. The phalanges not more than 4—5 in the same digit.

α. Two or more cervical vertebræ consolidated.

β. Teeth cylindric.

δ. Beak of skull short, broad; teeth few, large; a dorsal fin.

Teeth early deciduous .....Grampus.

Teeth permanent, acute.....Orca.

δδ. Beak of skull elongate, exceeding brain case; teeth small, numerous.

Dorsal fin present; teeth long, more or less acute.....Delphinus.

Dorsal fin none; teeth as last .....Delphinapterus.

Dorsal fin ? teeth short, obtusely rounded.....Sagmatias.

ββ. Teeth compressed, spade-shaped.

Dorsal fin present.....Phocæna.

Dorsal fin none .....Neomeris.

αα. Cervical vertebræ all distinct.

β. No dorsal fin.

Teeth little deciduous; incisors normal..... Beluga.

Teeth deciduous, except one incisor, which is prolonged into a tusk.

Monodon.

GLOBIOCEPHALUS Gray.

The "black-fish" of whalers are included in this genus; the species represent it in all seas as yet known. They differ less in remote regions than the species of some other genera do. The species of the eastern coasts of North America appears to be the same as that found on the coasts of Europe, the *G. melas*. The species of the Pacific coasts is fortunately so fully described by Capt. Scammon, that it can be distinguished very readily from those heretofore recorded.

GLOBIOCEPHALUS SCAMMONII Cope.

For details of character of this abundant species I refer to Capt. Scammon's description, and only contrast it here with the species to which it is allied. It pertains to the section of the genus characterized by the absence of white band or other mark on the abdomen, and is among these one of the most uniformly black species. Its more numerous teeth  $\frac{19-12}{8-10}$  distinguish it from *G. machrorhynchus* of the South Seas. In Gray's Catalogue three species remain for comparison, the *G. chinensis*, which probably does not belong to the genus; the *G. sieboldii*, which, not being described, cannot be regarded as valid; and *G. indicus* Blyth. The measurements of the latter indicate a much wider pectoral fin, a longer and lower dorsal fin, and considerably wider flukes. The measurements given by Blyth are as follows:

	Ft. In.
Total length.....	14 2
Width flippers.....	2 6
Length dorsal.....	2 6
Depth ".....	11
Extent of flukes.....	3

It inhabits the Bay of Bengal.

The present species is named in honor of Capt. Scammon, who has furnished us with a mass of information on the subject of the Marine Mammalia, and an amount of novelty in connection with it seldom equalled in the history of zoology.

1869.]